

SEQUENCE LISTING

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<120> Modular Protein Libraries and Methods of Preparation

<130> GRFN-020/01US

<140> US 09/144,838

<141> 1998-08-31

<150> US 60/057,620

<151> 1997-09-04

<160> 54

<170> PatentIn Ver. 2.1

<210> 1

<211> 81

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<220>

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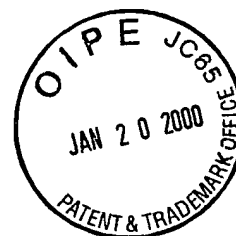
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1 5 10 15

Xaa Xaa Xaa Xaa Xaa Leu Ile Val Met Phe Tyr Xaa Xaa Arg Lys Ser  
20 25 30

Glu Gln Xaa Leu Ile Val Met Xaa Xaa Leu Ile Val Met Xaa Xaa Xaa  
35 40 45

Xaa Xaa Ser Ala Gly Xaa Xaa Cys Xaa Xaa Xaa Glu Gln Leu Ile Val  
50 55 60

Met Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Cys Leu Asp  
65 70 75 80

Asn

<210> 2  
<211> 82  
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Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Cys Cys Leu Ile Val Met Phe  
1 5 10 15

Tyr Thr Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
20 25 30

Leu Ile Val Met Phe Xaa Xaa Tyr Xaa Xaa Xaa Gly Ser Thr Asn Gly  
35 40 45

Ser Thr Asn Xaa Xaa Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
50 55 60

Met Xaa Xaa Phe Leu Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
65 70 75 80

Xaa Cys

<210> 3  
<211> 71  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Synthetic

<400> 3  
Ala Gly Ser Leu Val Ser Tyr Thr Pro Asn Ser Cys Cys Tyr Gly Phe  
1 5 10 15

Gln Gln His Pro Pro Pro Val Gln Ile Leu Lys Glu Trp Tyr Pro Thr  
20 25 30

Ser Pro Ala Cys Pro Lys Pro Gly Val Ile Leu Leu Thr Lys Arg Gly  
35 40 45

Arg Gln Ile Cys Ala Asp Pro Ser Lys Asn Trp Val Arg Gln Leu Met  
50 55 60

Gln Arg Leu Pro Ala Ile Ala  
65 70

<210> 4  
<211> 74  
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<220>  
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<400> 4  
Gly Asp Thr Leu Gly Ala Ser Trp His Arg Pro Asp Lys Cys Cys Leu  
1 5 10 15

Gly Tyr Gln Lys Arg Pro Leu Pro Gln Val Leu Leu Ser Ser Trp Tyr  
20 25 30

Pro Thr Ser Gln Leu Cys Ser Lys Pro Gly Val Ile Phe Leu Thr Lys  
35 40 45

Arg Gly Arg Gln Val Cys Ala Asp Lys Ser Lys Asp Trp Val Lys Lys  
50 55 60

Leu Met Gln Gln Leu Pro Val Thr Ala Arg  
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<210> 5  
<211> 72  
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<400> 5  
Ala Gly Ser Leu Val Ser Tyr Thr Pro Asn Ser Cys Cys Tyr Gly Phe  
1 5 10 15

Gln Gln His Pro Pro Pro Val Gln Ile Leu Lys Glu Trp Tyr Pro Thr

20

25

30

Ser Pro Ala Cys Ser Lys Pro Gly Val Ile Phe Leu Thr Lys Arg Gly  
35 40 45

Arg Gln Val Cys Ala Asp Lys Ser Lys Asp Trp Val Lys Lys Leu Met  
50 55 60

Gln Gln Leu Pro Val Thr Ala Arg  
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<210> 6

<211> 73

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<400> 6

Gly Asp Thr Leu Gly Ala Ser Trp His Arg Pro Asp Lys Cys Cys Leu  
1 5 10 15

Gly Tyr Gln Lys Arg Pro Leu Pro Gln Val Leu Leu Ser Ser Trp Tyr  
20 25 30

Pro Thr Ser Gln Leu Cys Pro Lys Pro Gly Val Ile Leu Leu Thr Lys  
35 40 45

Arg Gly Arg Gln Ile Cys Ala Asp Pro Ser Lys Asn Trp Val Arg Gln  
50 55 60

Leu Met Gln Arg Leu Pro Ala Ile Ala  
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<210> 7

<211> 93

<212> PRT

<213> Artificial Sequence

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Met Asn Ala Lys Val Val Val Val Leu Val Leu Val Leu Thr Ala Leu  
1 5 10 15

Cys Leu Ser Asp Gly Lys Pro Val Ser Leu Ser Tyr Arg Cys Pro Cys  
20 25 30

Arg Phe Phe Glu Ser His Val Ala Arg Ala Asn Val Lys His Leu Lys  
35 40 45

Ile Leu Asn Thr Pro Asn Cys Ala Leu Gln Ile Val Ala Arg Leu Lys  
50 55 60

Asn Asn Asn Arg Gln Val Cys Ile Asp Pro Lys Leu Lys Trp Ile Gln  
65 70 75 80

Glu Tyr Leu Glu Lys Ala Leu Asn Lys Arg Phe Lys Met  
85 90

<210> 8  
<211> 67  
<212> PRT  
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<220>  
<223> Description of Artificial Sequence: Synthetic

<400> 8  
Lys Pro Val Ser Leu Ser Tyr Arg Cys Pro Cys Arg Phe Phe Glu Ser  
1 5 10 15

His Val Ala Arg Ala Asn Val Lys His Leu Lys Ile Leu Asn Thr Pro  
20 25 30

Asn Cys Ala Leu Gln Ile Val Ala Arg Leu Lys Asn Asn Asn Arg Gln  
35 40 45

Val Cys Ile Asp Pro Lys Leu Lys Trp Ile Gln Glu Tyr Leu Glu Lys  
50 55 60

Ala Leu Asn  
65

<210> 9  
<211> 91  
<212> PRT  
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<220>

<223> Description of Artificial Sequence: Synthetic

<400> 9

Met Lys Val Ser Ala Ala Arg Leu Ala Val Ile Leu Ile Ala Thr Ala  
1 5 10 15

Leu Cys Ala Pro Ala Ser Ala Ser Pro Tyr Ser Ser Asp Thr Thr Pro  
20 25 30

Cys Cys Phe Ala Tyr Ile Ala Arg Pro Leu Pro Arg Ala His Ile Lys  
35 40 45

Glu Tyr Phe Tyr Thr Ser Gly Lys Cys Ser Asn Pro Ala Val Val Phe  
50 55 60

Val Thr Arg Lys Asn Arg Gln Val Cys Ala Asn Pro Glu Lys Lys Trp  
65 70 75 80

Val Arg Glu Tyr Ile Asn Ser Leu Glu Met Ser  
85 90

<210> 10

<211> 68

<212> PRT

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<220>

<223> Description of Artificial Sequence: Synthetic

<400> 10

Ser Pro Tyr Ser Ser Asp Thr Thr Pro Cys Cys Phe Ala Tyr Ile Ala  
1 5 10 15

Arg Pro Leu Pro Arg Ala His Ile Lys Glu Tyr Phe Tyr Thr Ser Gly  
20 25 30

Lys Cys Ser Asn Pro Ala Val Val Phe Val Thr Arg Lys Asn Arg Gln  
35 40 45

Val Cys Ala Asn Pro Glu Lys Lys Trp Val Arg Glu Tyr Ile Asn Ser  
50 55 60

Leu Glu Met Ser  
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<210> 11



<211> 33  
<212> PRT  
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<220>  
<223> Description of Artificial Sequence: Synthetic

<400> 11  
Lys Pro Val Ser Leu Ser Tyr Arg Cys Pro Cys Arg Phe Phe Glu Ser  
1 5 10 15

His Val Ala Arg Ala Asn Val Lys His Leu Lys Ile Leu Asn Thr Pro  
20 25 30

Asn

<210> 12  
<211> 32  
<212> PRT  
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<220>  
<223> Description of Artificial Sequence: Synthetic

<400> 12  
Lys Pro Val Ser Leu Ser Tyr Arg Cys Cys Arg Phe Phe Glu Ser His  
1 5 10 15

Val Ala Arg Ala Asn Val Lys His Leu Lys Ile Leu Asn Thr Pro Asn  
20 25 30

<210> 13  
<211> 33  
<212> PRT  
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<220>  
<223> Description of Artificial Sequence: Synthetic

<400> 13  
Lys Pro Val Ser Leu Ser Tyr Arg Cys Pro Cys Phe Ala Tyr Ile Ala  
1 5 10 15

Arg Pro Leu Pro Arg Ala His Ile Lys Glu Tyr Phe Tyr Thr Ser Gly  
 20 25 30

Lys

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<400> 14  
 Lys Pro Val Ser Leu Ser Tyr Arg Cys Cys Phe Ala Tyr Ile Ala Arg  
 1 5 10 15

Pro Leu Pro Arg Ala His Ile Lys Glu Tyr Phe Tyr Thr Ser Gly Lys  
 20 25 30

<210> 15  
 <211> 33  
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<400> 15  
 Ser Pro Tyr Ser Ser Asp Thr Thr Pro Cys Cys Phe Ala Tyr Ile Ala  
 1 5 10 15

Arg Pro Leu Pro Arg Ala His Ile Lys Glu Tyr Phe Tyr Thr Ser Gly  
 20 25 30

Lys

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<212> PRT

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<223> Description of Artificial Sequence: Synthetic

<400> 16

Ser Pro Tyr Ser Ser Asp Thr Thr Pro Cys Pro Cys Phe Ala Tyr Ile  
1 5 10 15

Ala Arg Pro Leu Pro Arg Ala His Ile Lys Glu Tyr Phe Tyr Thr Ser  
20 25 30

Gly Lys

<210> 17

<211> 33

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<400> 17

Ser Pro Tyr Ser Ser Asp Thr Thr Pro Cys Cys Arg Phe Phe Glu Ser  
1 5 10 15

His Val Ala Arg Ala Asn Val Lys His Leu Lys Ile Leu Asn Thr Pro  
20 25 30

Asn

<210> 18

<211> 34

<212> PRT

<213> Artificial Sequence

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<400> 18

Ser Pro Tyr Ser Ser Asp Thr Thr Pro Cys Pro Cys Arg Phe Phe Glu  
1 5 10 15

Ser His Val Ala Arg Ala Asn Val Lys His Leu Lys Ile Leu Asn Thr  
 20 25 30

Pro Asn

<210> 19  
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<220>  
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<400> 19  
 Cys Ala Leu Gln Ile Val Ala Arg Leu Lys Asn Asn Asn Arg Gln Val  
 1 5 10 15

Cys Ile Asp Pro Lys Leu Lys Trp Ile Gln Glu Tyr Leu Glu Lys Ala  
 20 25 30

Leu Asn

<210> 20  
 <211> 35  
 <212> PRT  
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<220>  
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<400> 20  
 Cys Ala Leu Gln Ile Val Ala Arg Leu Lys Asn Asn Asn Arg Gln Val  
 1 5 10 15

Cys Ala Asn Pro Glu Lys Lys Trp Val Arg Glu Tyr Ile Asn Ser Leu  
 20 25 30

Glu Met Ser  
 35

<210> 21  
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<213> Artificial Sequence

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<400> 21

Cys Ser Asn Pro Ala Val Val Phe Val Thr Arg Lys Asn Arg Gln Val  
1 5 10 15

Cys Ile Asp Pro Lys Leu Lys Trp Ile Gln Glu Tyr Leu Glu Lys Ala  
20 25 30

Leu Asn

<210> 22

<211> 35

<212> PRT

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Synthetic

<400> 22

Cys Ser Asn Pro Ala Val Val Phe Val Thr Arg Lys Asn Arg Gln Val  
1 5 10 15

Cys Ala Asn Pro Glu Lys Lys Trp Val Arg Glu Tyr Ile Asn Ser Leu  
20 25 30

Glu Met Ser  
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<210> 23

<211> 67

<212> PRT

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Synthetic

<400> 23

Lys Pro Val Ser Leu Ser Tyr Arg Cys Pro Cys Arg Phe Phe Glu Ser  
1 5 10 15

His Val Ala Arg Ala Asn Val Lys His Leu Lys Ile Leu Asn Thr Pro

20

25

30

Asn Cys Ala Leu Gln Ile Val Ala Arg Leu Lys Asn Asn Asn Arg Gln  
 35 40 45

Val Cys Ile Asp Pro Lys Leu Lys Trp Ile Gln Glu Tyr Leu Glu Lys  
 50 55 60

Ala Leu Asn  
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<210> 24

<211> 68

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<400> 24

Lys Pro Val Ser Leu Ser Tyr Arg Cys Pro Cys Arg Phe Phe Glu Ser  
 1 5 10 15

His Val Ala Arg Ala Asn Val Lys His Leu Lys Ile Leu Asn Thr Pro  
 20 25 30

Asn Cys Ala Leu Gln Ile Val Ala Arg Leu Lys Asn Asn Asn Arg Gln  
 35 40 45

Val Cys Ala Asn Pro Glu Lys Lys Trp Val Arg Glu Tyr Ile Asn Ser  
 50 55 60

Leu Glu Met Ser  
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<210> 25

<211> 67

<212> PRT

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Synthetic

<400> 25

Lys Pro Val Ser Leu Ser Tyr Arg Cys Pro Cys Arg Phe Phe Glu Ser  
 1 5 10 15

His Val Ala Arg Ala Asn Val Lys His Leu Lys Ile Leu Asn Thr Pro  
20 25 30

Asn Cys Ser Asn Pro Ala Val Val Phe Val Thr Arg Lys Asn Arg Gln  
35 40 45

Val Cys Ile Asp Pro Lys Leu Lys Trp Ile Gln Glu Tyr Leu Glu Lys  
50 55 60

Ala Leu Asn  
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<210> 26

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<212> PRT

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<223> Description of Artificial Sequence: Synthetic

<400> 26

Lys Pro Val Ser Leu Ser Tyr Arg Cys Pro Cys Arg Phe Phe Glu Ser  
1 5 10 15

His Val Ala Arg Ala Asn Val Lys His Leu Lys Ile Leu Asn Thr Pro  
20 25 30

Asn Cys Ser Asn Pro Ala Val Val Phe Val Thr Arg Lys Asn Arg Gln  
35 40 45

Val Cys Ala Asn Pro Glu Lys Lys Trp Val Arg Glu Tyr Ile Asn Ser  
50 55 60

Leu Glu Met Ser  
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<210> 27

<211> 66

<212> PRT

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<223> Description of Artificial Sequence: Synthetic

<400> 27

Lys Pro Val Ser Leu Ser Tyr Arg Cys Cys Arg Phe Phe Glu Ser His  
1 5 10 15

Val Ala Arg Ala Asn Val Lys His Leu Lys Ile Leu Asn Thr Pro Asn  
20 25 30

Cys Ala Leu Gln Ile Val Ala Arg Leu Lys Asn Asn Asn Arg Gln Val  
35 40 45

Cys Ile Asp Pro Lys Leu Lys Trp Ile Gln Glu Tyr Leu Glu Lys Ala  
50 55 60

Leu Asn  
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<210> 28

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<223> Description of Artificial Sequence: Synthetic

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Lys Pro Val Ser Leu Ser Tyr Arg Cys Cys Arg Phe Phe Glu Ser His  
1 5 10 15

Val Ala Arg Ala Asn Val Lys His Leu Lys Ile Leu Asn Thr Pro Asn  
20 25 30

Cys Ala Leu Gln Ile Val Ala Arg Leu Lys Asn Asn Asn Arg Gln Val  
35 40 45

Cys Ala Asn Pro Glu Lys Lys Trp Val Arg Glu Tyr Ile Asn Ser Leu  
50 55 60

Glu Met Ser  
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<210> 29

<211> 66

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<223> Description of Artificial Sequence: Synthetic



<400> 29

Lys Pro Val Ser Leu Ser Tyr Arg Cys Cys Arg Phe Phe Glu Ser His  
1 5 10 15

Val Ala Arg Ala Asn Val Lys His Leu Lys Ile Leu Asn Thr Pro Cys  
20 25 30

Asn Ser Asn Pro Ala Val Val Phe Val Thr Arg Lys Asn Arg Gln Val  
35 40 45

Cys Ile Asp Pro Lys Leu Lys Trp Ile Gln Glu Tyr Leu Glu Lys Ala  
50 55 60

Leu Asn  
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<210> 30

<211> 67

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<223> Description of Artificial Sequence: Synthetic

<400> 30

Lys Pro Val Ser Leu Ser Tyr Arg Cys Cys Arg Phe Phe Glu Ser His  
1 5 10 15

Val Ala Arg Ala Asn Val Lys His Leu Lys Ile Leu Asn Thr Pro Asn  
20 25 30

Cys Ser Asn Pro Ala Val Val Phe Val Thr Arg Lys Asn Arg Gln Val  
35 40 45

Cys Ala Asn Pro Glu Lys Lys Trp Val Arg Glu Tyr Ile Asn Ser Leu  
50 55 60

Glu Met Ser  
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<210> 31

<211> 67

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic

<400> 31

Lys Pro Val Ser Leu Ser Tyr Arg Cys Pro Cys Phe Ala Tyr Ile Ala  
1 5 10 15

Arg Pro Leu Pro Arg Ala His Ile Lys Glu Tyr Phe Tyr Thr Ser Gly  
20 25 30

Lys Cys Ala Leu Gln Ile Val Ala Arg Leu Lys Asn Asn Asn Arg Gln  
35 40 45

Val Cys Ile Asp Pro Lys Leu Lys Trp Ile Gln Glu Tyr Leu Glu Lys  
50 55 60

Ala Leu Asn  
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<210> 32

<211> 68

<212> PRT

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Synthetic

<400> 32

Lys Pro Val Ser Leu Ser Tyr Arg Cys Pro Cys Phe Ala Tyr Ile Ala  
1 5 10 15

Arg Pro Leu Pro Arg Ala His Ile Lys Glu Tyr Phe Tyr Thr Ser Gly  
20 25 30

Lys Cys Ala Leu Gln Ile Val Ala Arg Leu Lys Asn Asn Asn Arg Gln  
35 40 45

Val Cys Ala Asn Pro Glu Lys Lys Trp Val Arg Glu Tyr Ile Asn Ser  
50 55 60

Leu Glu Met Ser  
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<210> 33

<211> 67

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<213> Artificial Sequence

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<223> Description of Artificial Sequence: Synthetic

<400> 33

Lys Pro Val Ser Leu Ser Tyr Arg Cys Pro Cys Phe Ala Tyr Ile Ala  
1 5 10 15

Arg Pro Leu Pro Arg Ala His Ile Lys Glu Tyr Phe Tyr Thr Ser Gly  
20 25 30

Lys Cys Ser Asn Pro Ala Val Val Phe Val Thr Arg Lys Asn Arg Gln  
35 40 45

Val Cys Ile Asp Pro Lys Leu Lys Trp Ile Gln Glu Tyr Leu Glu Lys  
50 55 60

Ala Leu Asn  
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<210> 34

<211> 68

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic

<400> 34

Lys Pro Val Ser Leu Ser Tyr Arg Cys Pro Cys Phe Ala Tyr Ile Ala  
1 5 10 15

Arg Pro Leu Pro Arg Ala His Ile Lys Glu Tyr Phe Tyr Thr Ser Gly  
20 25 30

Lys Cys Ser Asn Pro Ala Val Val Phe Val Thr Arg Lys Asn Arg Gln  
35 40 45

Val Cys Ala Asn Pro Glu Lys Lys Trp Val Arg Glu Tyr Ile Asn Ser  
50 55 60

Leu Glu Met Ser  
65

<210> 35

<211> 66  
<212> PRT  
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<223> Description of Artificial Sequence: Synthetic

<400> 35

Lys Pro Val Ser Leu Ser Tyr Arg Cys Cys Phe Ala Tyr Ile Ala Arg  
1 5 10 15

Pro Leu Pro Arg Ala His Ile Lys Glu Tyr Phe Tyr Thr Ser Gly Lys  
20 25 30

Cys Ala Leu Gln Ile Val Ala Arg Leu Lys Asn Asn Asn Arg Gln Val  
35 40 45

Cys Ile Asp Pro Lys Leu Lys Trp Ile Gln Glu Tyr Leu Glu Lys Ala  
50 55 60

Leu Asn  
65

<210> 36

<211> 67

<212> PRT

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Synthetic

<400> 36

Lys Pro Val Ser Leu Ser Tyr Arg Cys Cys Phe Ala Tyr Ile Ala Arg  
1 5 10 15

Pro Leu Pro Arg Ala His Ile Lys Glu Tyr Phe Tyr Thr Ser Gly Lys  
20 25 30

Cys Ala Leu Gln Ile Val Ala Arg Leu Lys Asn Asn Asn Arg Gln Val  
35 40 45

Cys Ala Asn Pro Glu Lys Lys Trp Val Arg Glu Tyr Ile Asn Ser Leu  
50 55 60

Glu Met Ser  
65

<210> 37

<211> 66

<212> PRT

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Synthetic

<400> 37

Lys Pro Val Ser Leu Ser Tyr Arg Cys Cys Phe Ala Tyr Ile Ala Arg  
1 5 10 15

Pro Leu Pro Arg Ala His Ile Lys Glu Tyr Phe Tyr Thr Ser Gly Lys  
20 25 30

Cys Ser Asn Pro Ala Val Val Phe Val Thr Arg Lys Asn Arg Gln Val  
35 40 45

Cys Ile Asp Pro Lys Leu Lys Trp Ile Gln Glu Tyr Leu Glu Lys Ala  
50 55 60

Leu Asn  
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<210> 38

<211> 67

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<223> Description of Artificial Sequence: Synthetic

<400> 38

Lys Pro Val Ser Leu Ser Tyr Arg Cys Cys Phe Ala Tyr Ile Ala Arg  
1 5 10 15

Pro Leu Pro Arg Ala His Ile Lys Glu Tyr Phe Tyr Thr Ser Gly Lys  
20 25 30

Cys Ser Asn Pro Ala Val Val Phe Val Thr Arg Lys Asn Arg Gln Val  
35 40 45

Cys Ala Asn Pro Glu Lys Lys Trp Val Arg Glu Tyr Ile Asn Ser Leu  
50 55 60

Glu Met Ser

65

<210> 39

<211> 67

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<223> Description of Artificial Sequence: Synthetic

<400> 39

Ser Pro Tyr Ser Ser Asp Thr Thr Pro Cys Cys Phe Ala Tyr Ile Ala  
1 5 10 15

Arg Pro Leu Pro Arg Ala His Ile Lys Glu Tyr Phe Tyr Thr Ser Gly  
20 25 30

Lys Cys Ala Leu Gln Ile Val Ala Arg Leu Lys Asn Asn Asn Arg Gln  
35 40 45

Val Cys Ile Asp Pro Lys Leu Lys Trp Ile Gln Glu Tyr Leu Glu Lys  
50 55 60

Ala Leu Asn  
65

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Ser Pro Tyr Ser Ser Asp Thr Thr Pro Cys Cys Phe Ala Tyr Ile Ala  
1 5 10 15

Arg Pro Leu Pro Arg Ala His Ile Lys Glu Tyr Phe Tyr Thr Ser Gly  
20 25 30

Lys Cys Ala Leu Gln Ile Val Ala Arg Leu Lys Asn Asn Asn Arg Gln  
35 40 45

Val Cys Ala Asn Pro Glu Lys Lys Trp Val Arg Glu Tyr Ile Asn Ser  
50 55 60

Leu Glu Met Ser  
65

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Ser Pro Tyr Ser Ser Asp Thr Thr Pro Cys Cys Phe Ala Tyr Ile Ala  
1 5 10 15  
Arg Pro Leu Pro Arg Ala His Ile Lys Glu Tyr Phe Tyr Thr Ser Gly  
20 25 30  
Lys Cys Ser Asn Pro Ala Val Val Phe Val Thr Arg Lys Asn Arg Gln  
35 40 45  
Val Cys Ile Asp Pro Lys Leu Lys Trp Ile Gln Glu Tyr Leu Glu Lys  
50 55 60

Ala Leu Asn  
65

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<400> 42  
Ser Pro Tyr Ser Ser Asp Thr Thr Pro Cys Cys Phe Ala Tyr Ile Ala  
1 5 10 15  
Arg Pro Leu Pro Arg Ala His Ile Lys Glu Tyr Phe Tyr Thr Ser Gly  
20 25 30  
Lys Cys Ser Asn Pro Ala Val Val Phe Val Thr Arg Lys Asn Arg Gln  
35 40 45

Val Cys Ala Asn Pro Glu Lys Lys Trp Val Arg Glu Tyr Ile Asn Ser  
50 55 60

Leu Glu Met Ser  
65

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<223> Description of Artificial Sequence: Synthetic

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Ser Pro Tyr Ser Ser Asp Thr Thr Pro Cys Pro Cys Phe Ala Tyr Ile  
1 5 10 15

Ala Arg Pro Leu Pro Arg Ala His Ile Lys Glu Tyr Phe Tyr Thr Ser  
20 25 30

Gly Lys Cys Ala Leu Gln Ile Val Ala Arg Leu Lys Asn Asn Asn Arg  
35 40 45

Gln Val Cys Ile Asp Pro Lys Leu Lys Trp Ile Gln Glu Tyr Leu Glu  
50 55 60

Lys Ala Leu Asn  
65

<210> 44

<211> 69

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic

<400> 44

Ser Pro Tyr Ser Ser Asp Thr Thr Pro Cys Pro Cys Phe Ala Tyr Ile  
1 5 10 15

Ala Arg Pro Leu Pro Arg Ala His Ile Lys Glu Tyr Phe Tyr Thr Ser  
20 25 30

Gly Lys Cys Ala Leu Gln Ile Val Ala Arg Leu Lys Asn Asn Asn Arg



35

40

45

Gln Val Cys Ala Asn Pro Glu Lys Lys Trp Val Arg Glu Tyr Ile Asn  
 50 55 60

Ser Leu Glu Met Ser  
 65

&lt;210&gt; 45

&lt;211&gt; 68

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Description of Artificial Sequence: Synthetic

&lt;400&gt; 45

Ser Pro Tyr Ser Ser Asp Thr Thr Pro Cys Pro Cys Phe Ala Tyr Ile  
 1 5 10 15

Ala Arg Pro Leu Pro Arg Ala His Ile Lys Glu Tyr Phe Tyr Thr Ser  
 20 25 30

Gly Lys Cys Ser Asn Pro Ala Val Val Phe Val Thr Arg Lys Asn Arg  
 35 40 45

Gln Val Cys Ile Asp Pro Lys Leu Lys Trp Ile Gln Glu Tyr Leu Glu  
 50 55 60

Lys Ala Leu Asn  
 65

&lt;210&gt; 46

&lt;211&gt; 69

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Description of Artificial Sequence: Synthetic

&lt;400&gt; 46

Ser Pro Tyr Ser Ser Asp Thr Thr Pro Cys Pro Cys Phe Ala Tyr Ile  
 1 5 10 15

Ala Arg Pro Leu Pro Arg Ala His Ile Lys Glu Tyr Phe Tyr Thr Ser  
 20 25 30

Gly Lys Cys Ser Asn Pro Ala Val Val Phe Val Thr Arg Lys Asn Arg  
35 40 45

Gln Val Cys Ala Asn Pro Glu Lys Lys Trp Val Arg Glu Tyr Ile Asn  
50 55 60

Ser Leu Glu Met Ser  
65

<210> 47

<211> 67

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic

<400> 47

Ser Pro Tyr Ser Ser Asp Thr Thr Pro Cys Cys Arg Phe Phe Glu Ser  
1 5 10 15

His Val Ala Arg Ala Asn Val Lys His Leu Lys Ile Leu Asn Thr Pro  
20 25 30

Asn Cys Ala Leu Gln Ile Val Ala Arg Leu Lys Asn Asn Asn Arg Gln  
35 40 45

Val Cys Ile Asp Pro Lys Leu Lys Trp Ile Gln Glu Tyr Leu Glu Lys  
50 55 60

Ala Leu Asn  
65

<210> 48

<211> 68

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic

<400> 48

Ser Pro Tyr Ser Ser Asp Thr Thr Pro Cys Cys Arg Phe Phe Glu Ser  
1 5 10 15

His Val Ala Arg Ala Asn Val Lys His Leu Lys Ile Leu Asn Thr Pro  
20 25 30

Asn Cys Ala Leu Gln Ile Val Ala Arg Leu Lys Asn Asn Asn Arg Gln  
35 40 45

Val Cys Ala Asn Pro Glu Lys Lys Trp Val Arg Glu Tyr Ile Asn Ser  
50 55 60

Leu Glu Met Ser  
65

<210> 49

<211> 67

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic

<400> 49

Ser Pro Tyr Ser Ser Asp Thr Thr Pro Cys Cys Arg Phe Phe Glu Ser  
1 5 10 15

His Val Ala Arg Ala Asn Val Lys His Leu Lys Ile Leu Asn Thr Pro  
20 25 30

Asn Cys Ser Asn Pro Ala Val Val Phe Val Thr Arg Lys Asn Arg Gln  
35 40 45

Val Cys Ile Asp Pro Lys Leu Lys Trp Ile Gln Glu Tyr Leu Glu Lys  
50 55 60

Ala Leu Asn  
65

<210> 50

<211> 68

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic

<400> 50

Ser Pro Tyr Ser Ser Asp Thr Thr Pro Cys Cys Arg Phe Phe Glu Ser

1

5

10

15

His Val Ala Arg Ala Asn Val Lys His Leu Lys Ile Leu Asn Thr Pro  
20 25 30

Asn Cys Ser Asn Pro Ala Val Val Phe Val Thr Arg Lys Asn Arg Gln  
35 40 45

Val Cys Ala Asn Pro Glu Lys Lys Trp Val Arg Glu Tyr Ile Asn Ser  
50 55 60

Leu Glu Met Ser  
65

<210> 51

<211> 68

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic

<400> 51

Ser Pro Tyr Ser Ser Asp Thr Thr Pro Cys Pro Cys Arg Phe Phe Glu  
1 5 10 15

Ser His Val Ala Arg Ala Asn Val Lys His Leu Lys Ile Leu Asn Thr  
20 25 30

Pro Asn Cys Ala Leu Gln Ile Val Ala Arg Leu Lys Asn Asn Asn Arg  
35 40 45

Gln Val Cys Ile Asp Pro Lys Leu Lys Trp Ile Gln Glu Tyr Leu Glu  
50 55 60

Lys Ala Leu Asn  
65

<210> 52

<211> 69

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic

<400> 52

Ser Pro Tyr Ser Ser Asp Thr Thr Pro Cys Pro Cys Arg Phe Phe Glu  
1 5 10 15

Ser His Val Ala Arg Ala Asn Val Lys His Leu Lys Ile Leu Asn Thr  
20 25 30

Pro Asn Cys Ala Leu Gln Ile Val Ala Arg Leu Lys Asn Asn Asn Arg  
35 40 45

Gln Val Cys Ala Asn Pro Glu Lys Lys Trp Val Arg Glu Tyr Ile Asn  
50 55 60

Ser Leu Glu Met Ser  
65

<210> 53

<211> 68

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic

<400> 53

Ser Pro Tyr Ser Ser Asp Thr Thr Pro Cys Pro Cys Arg Phe Phe Glu  
1 5 10 15

Ser His Val Ala Arg Ala Asn Val Lys His Leu Lys Ile Leu Asn Thr  
20 25 30

Pro Asn Cys Ser Asn Pro Ala Val Val Phe Val Thr Arg Lys Asn Arg  
35 40 45

Gln Val Cys Ile Asp Pro Lys Leu Lys Trp Ile Gln Glu Tyr Leu Glu  
50 55 60

Lys Ala Leu Asn  
65

<210> 54

<211> 69

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic

<400> 54

Ser Pro Tyr Ser Ser Asp Thr Thr Pro Cys Pro Cys Arg Phe Phe Glu  
1 5 10 15

Ser His Val Ala Arg Ala Asn Val Lys His Leu Lys Ile Leu Asn Thr  
20 25 30

Pro Asn Cys Ser Asn Pro Ala Val Val Phe Val Thr Arg Lys Asn Arg  
35 40 45

Gln Val Cys Ala Asn Pro Glu Lys Lys Trp Val Arg Glu Tyr Ile Asn  
50 55 60

Ser Leu Glu Met Ser  
65